

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
23 December 2004 (23.12.2004)

PCT

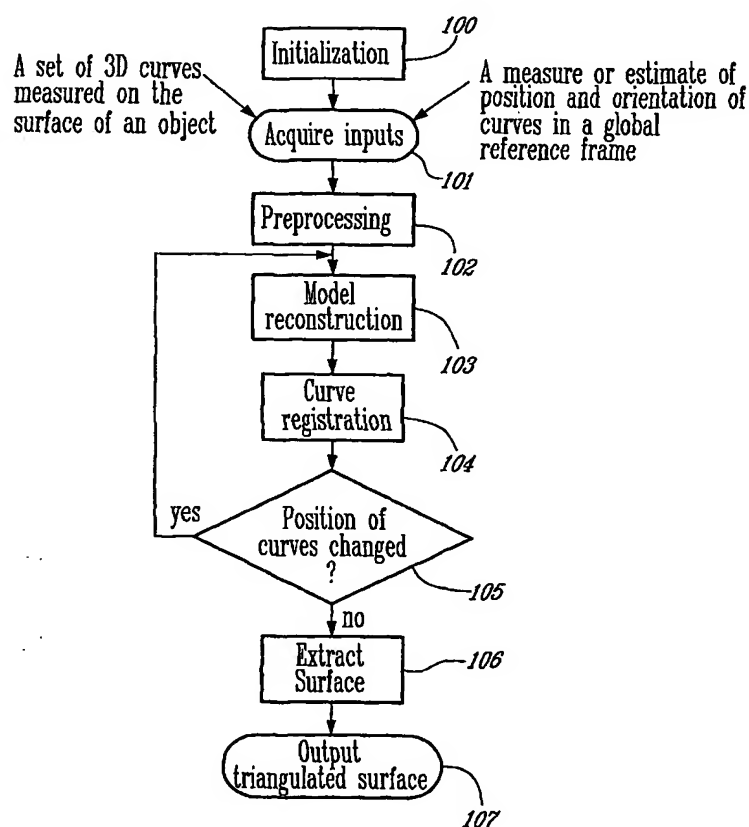
(10) International Publication Number  
**WO 2004/111927 A2**

- (51) International Patent Classification<sup>7</sup>: **G06T**
- (21) International Application Number:  
PCT/CA2004/000864
- (22) International Filing Date: 11 June 2004 (11.06.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/477,933 13 June 2003 (13.06.2003) US
- (71) Applicant (for all designated States except US): **UNIVERSITÉ LAVAL** [CA/CA]; Université Laval, Québec, Québec G1K 7P4 (CA).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **TUBIC, Dragan**

- [CA/CA]; 4185, 3ème Avenue Ouest, App. 7, Charlesbourg, Québec G1H 6E2 (CA). **HÉBERT, Patrick** [CA/CA]; 2571, Lalonde, Sainte-Foy, Québec G1W 1M8 (CA). **LAURENDEAU, Denis** [CA/CA]; 1627, Candide-Ducharme, Cap-Rouge, Québec G1Y 3V6 (CA).
- (74) Agent: **OGILVY RENAULT**; Suite 1600, 1981 McGill College Avenue, Montreal, Québec H3A 2Y3 (CA).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

[Continued on next page]

(54) Title: **THREE-DIMENSIONAL MODELING FROM ARBITRARY THREE-DIMENSIONAL CURVES**



(57) Abstract: The present invention relates to a method and a system for creating three-dimensional models of objects from sets of arbitrary three-dimensional entities obtained from target surfaces. It also provides an efficient method for individually refining the alignment of curves to improve the accuracy of the surface model with a linear complexity with respect to the number of curves. The principle behind the invention is that a set of three-dimensional entities, at their approximate positions, creates a field from which the surface can be extracted. The field is constructed in a manner such that the three-dimensional entities are attracted toward the extracted surface. This attraction is used to accurately register each three-dimensional entity with respect to extracted surface. Through iterations, both the field and the entity positions are refined.



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— *without international search report and to be republished upon receipt of that report*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*